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(54) **PRE-SHAPED SPIRAL INTRAOCULAR LENS
FIXATION DEVICE**

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(58) **Field of Classification Search**

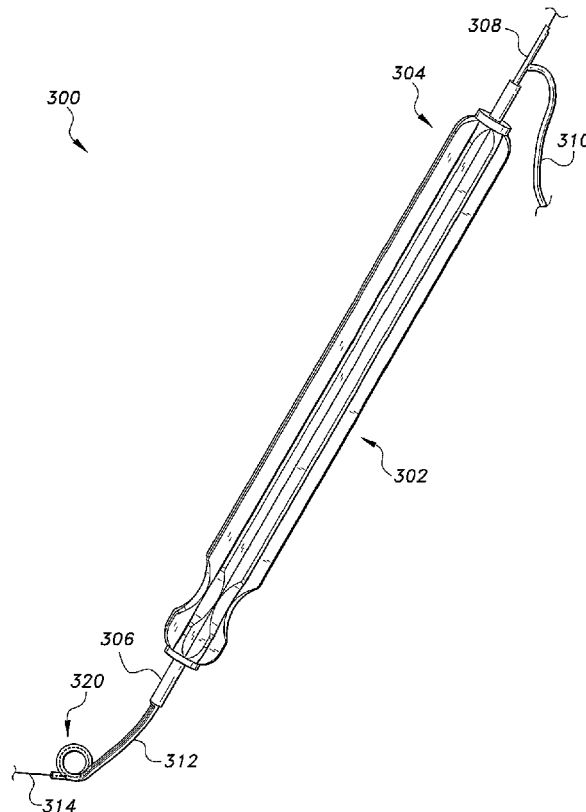
CPC .. A61F 2/1662; A61F 2/1664; A61F 2/1667;
A61F 2/167; A61F 2/1672; A61F 2/1675;
A61F 2/1678

See application file for complete search history.

(57) **ABSTRACT**

The pre-shaped spiral intraocular lens fixation device has a hollow housing, the hollow housing having an elongate neck, an elongate handle, and a vacuum chamber. A selectively operable vacuum source is operatively attached to the housing to provide suction. A head is disposed at an end of the neck distal from the handle and a tubular structure is positioned within the hollow housing and extending through the neck out through the head. The tubular structure has a spiral-shaped position and can be made of a nitinol material. An actuating mechanism moves the tubular structure from a spiral-shaped position to a straight position.

1 Claim, 4 Drawing Sheets



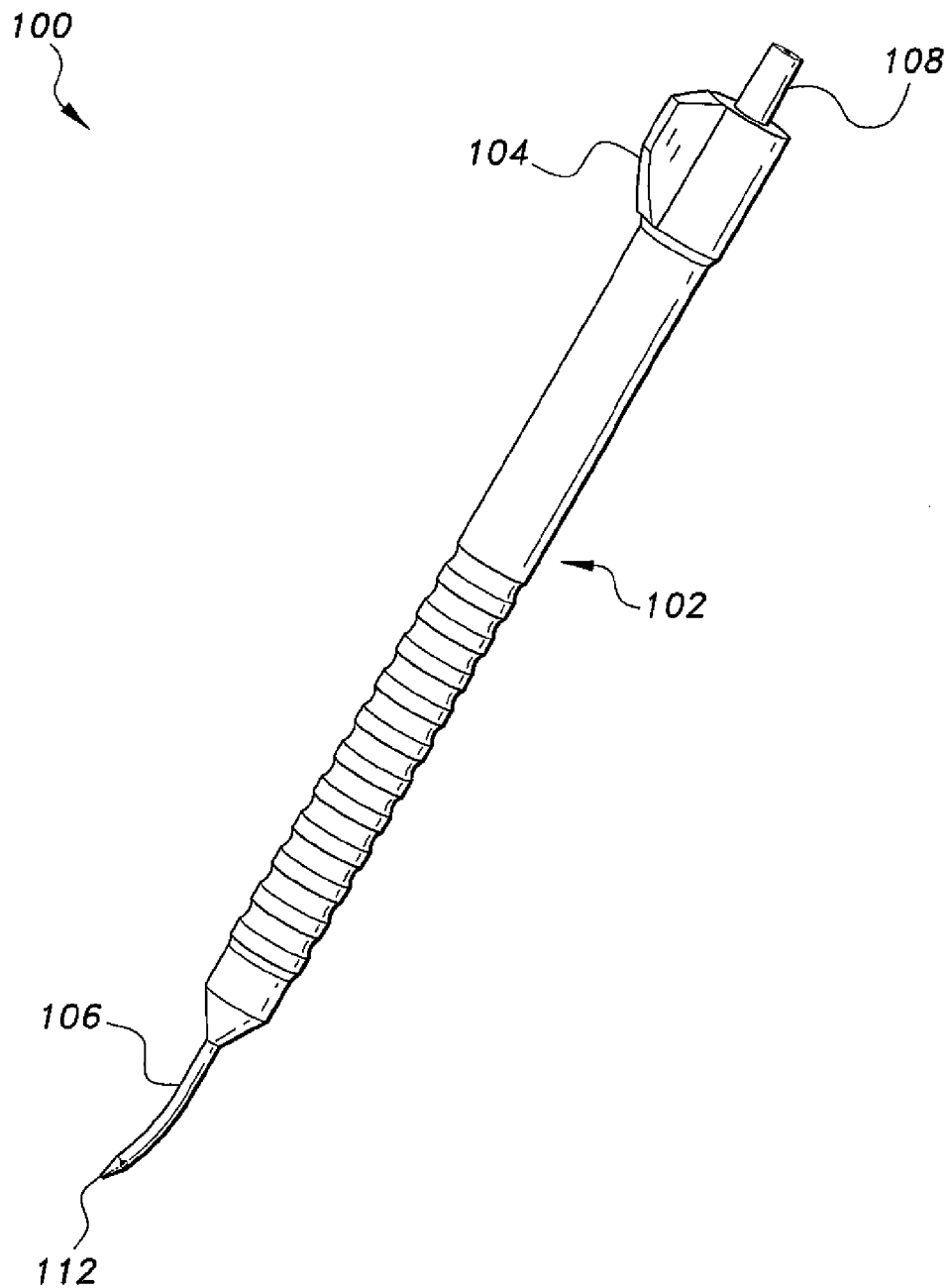


Fig. 1

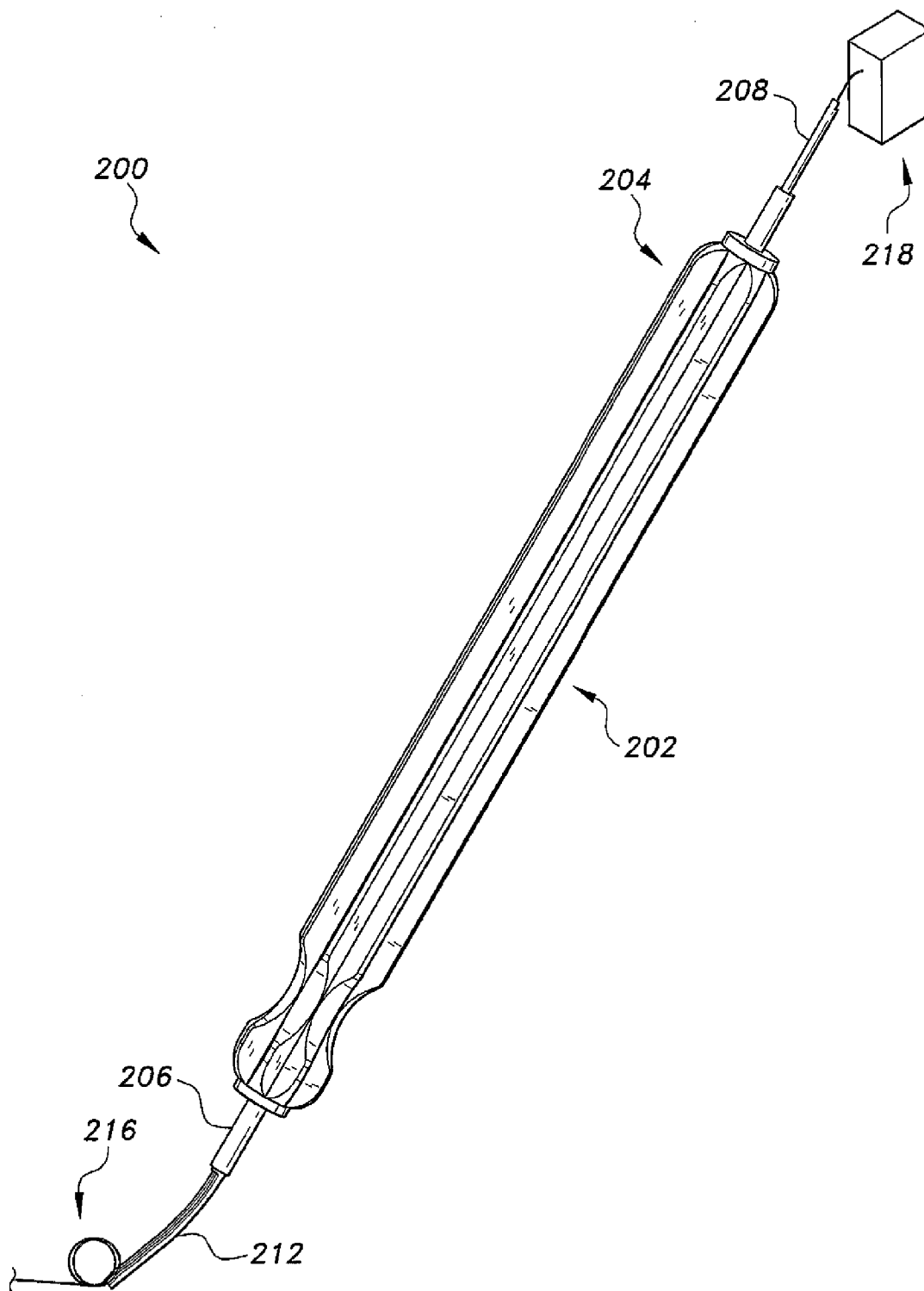


Fig. 2A

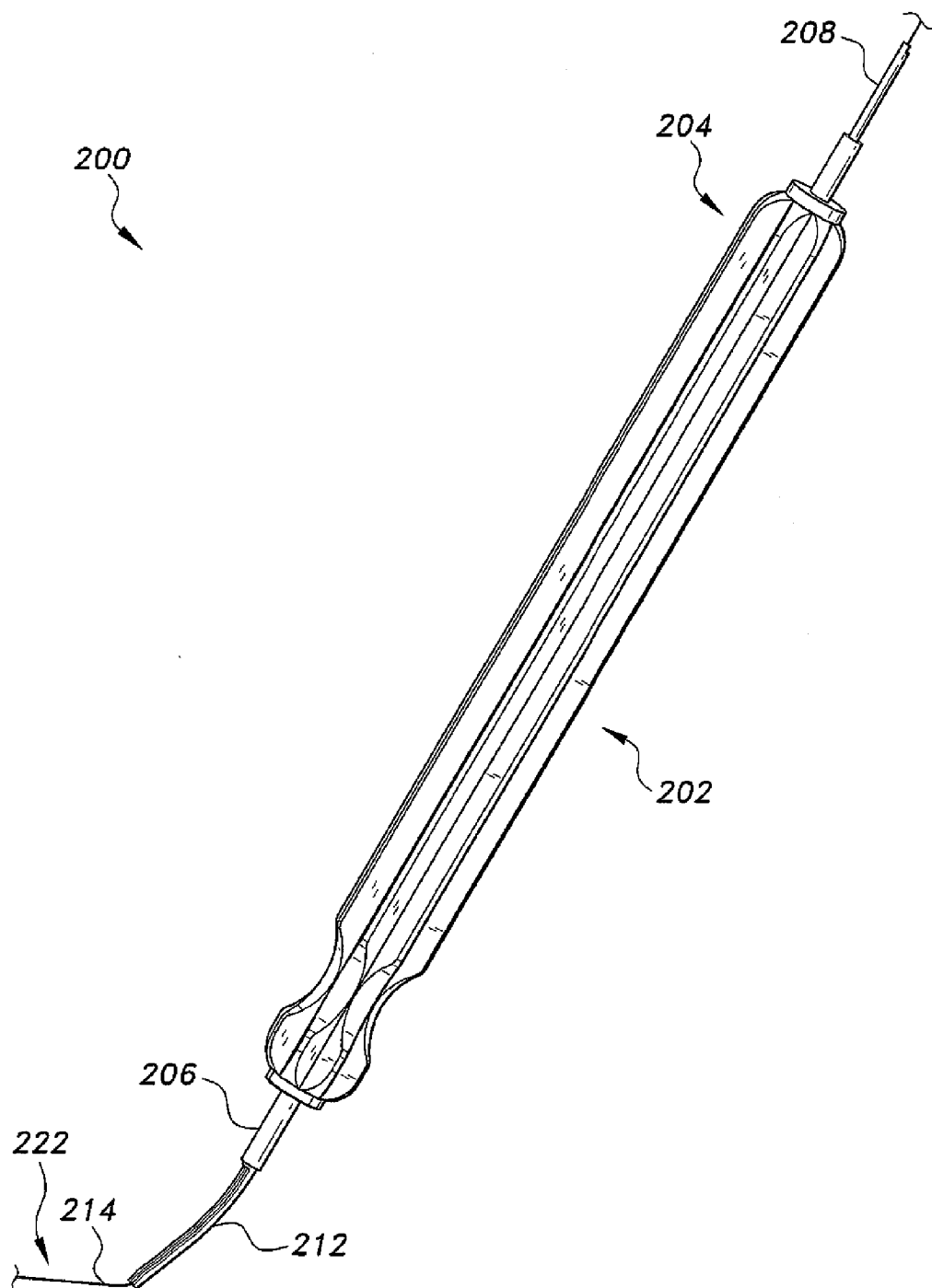


Fig. 2B

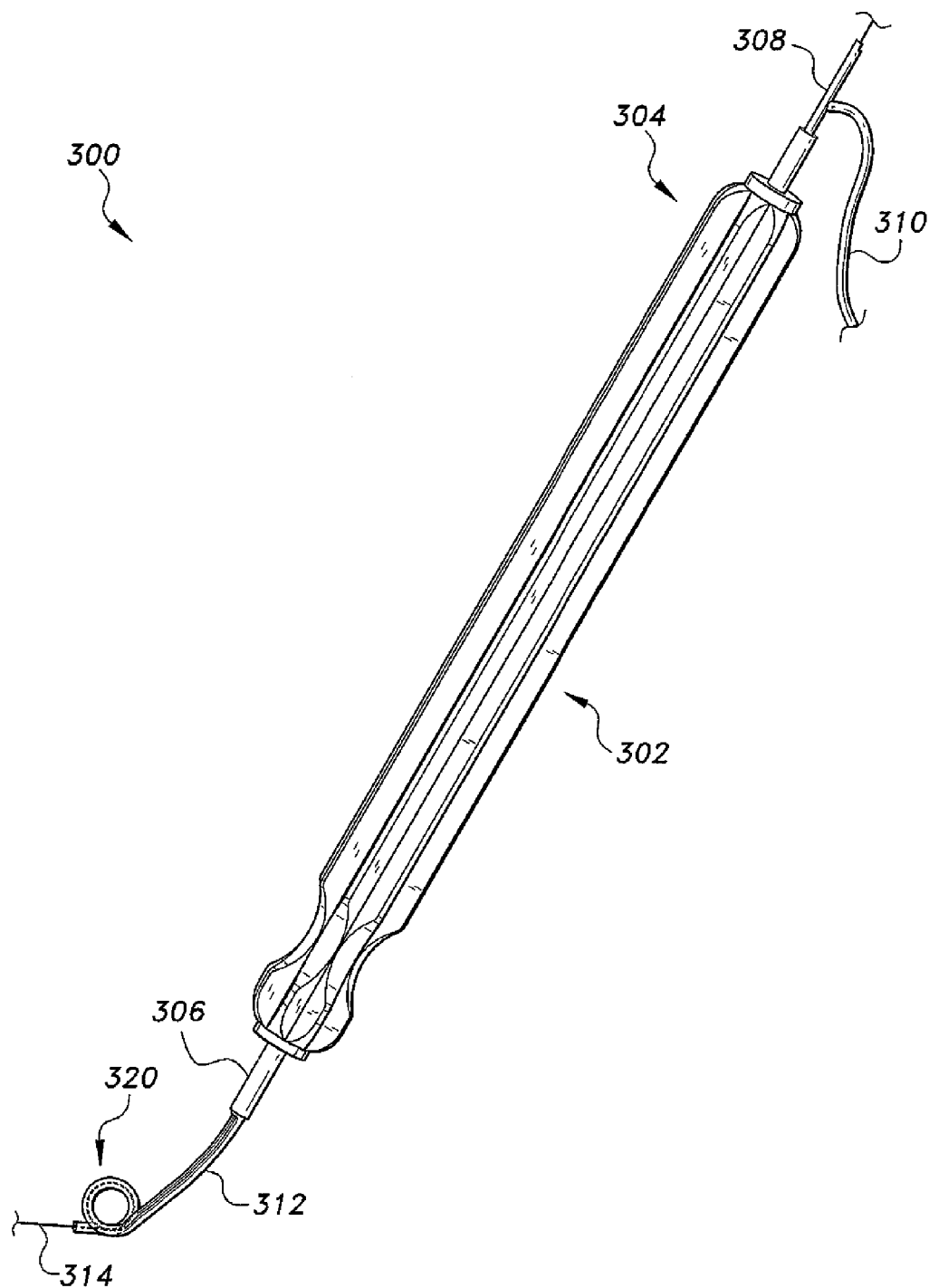


Fig. 3

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PRE-SHAPED SPIRAL INTRAOCULAR LENS FIXATION DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to ophthalmic surgery, and particularly to an intraocular lens fixation device using a nitinol pre-shaped spiral tube to align the lens in the eye.

2. Description of the Related Art

Intraocular lens fixation devices allow for the placement of a lens in the eye of a patient. In certain situations, the lens can have a need to be adjusted. Current intraocular lens fixation devices can be intrusive and difficult to manipulate the lens during surgery to implant the lens in the patient's eye. Further, these devices can be difficult to achieve rotational movement of the lens in the eye.

Thus, a pre-shaped spiral intraocular lens fixation device solving the aforementioned problems is desired.

SUMMARY OF THE INVENTION

The pre-shaped spiral intraocular lens fixation device includes a hollow housing. The hollow housing has an elongate neck, an elongate handle, and a vacuum chamber. A selectively operable vacuum source is operatively attached to the housing to provide suction. A head is disposed at an end of the neck distal from the handle, and a tubular structure is positioned within the hollow housing and extending through the neck out through the head. The tubular structure has a spiral-shaped region adjacent to the head, which can be made of nitinol tubing. An actuating mechanism is selectively movable and moves the tubular structure from a spiral-shaped position to a straight position.

These and other features of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a first embodiment of a pre-shaped spiral intraocular lens fixation device according to the present invention.

FIGS. 2A and 2B are perspective views of a second embodiment of a pre-shaped spiral intraocular lens fixation device according to the present invention, shown with the spiral region coiled and extended, respectively.

FIG. 3 is a perspective view of a third embodiment of a pre-shaped spiral intraocular lens fixation device according to the present invention where the tubular structure has been actuated.

Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, a pre-shaped spiral intraocular lens fixation device **100** is shown. The pre-shaped spiral intraocular lens fixation device **100** has a hollow housing **102**. At an end of the housing **102** is a handle **104** and remote from the handle **104** is a neck **106**. The handle **104** can be manipulated by an operator and can be any suitable shape, such as a knob. The neck **106** can be straight or curved, depending on the user's needs. A vacuum chamber **108** is included in the housing **102** and can be in communication with a vacuum source. A head region **112** of the neck is

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positioned adjacent to the neck **106** and allows for communication between the patient and the housing **102**.

Referring to FIGS. 2A and 2B, another embodiment of a pre-shaped spiral intraocular lens fixation device **200** is shown. Similar to pre-shaped spiral intraocular lens fixation device **100**, the pre-shaped spiral intraocular lens fixation device **200** has a hollow housing **202**, a handle **204**, a neck **206**, a vacuum chamber **208**, and a head **212**. A tubular structure **214** extends through the hollow housing **202**, through the neck **206**, and out the head **212**. The tubular structure **214** can be a wire used in medical procedures, for example. Further, the wire can be composed of various materials, such as nitinol for example. The nitinol material can be a Nitinol 2D flat structure.

As shown in FIG. 2A, the tubular structure **214** includes a pre-shaped spiral region **216**. The pre-shaped spiral region **216** is adjacent to the head **212** and remote from the handle **204**. An actuating mechanism **218** allows for a user to actuate the tubular structure **214** from a pre-shaped spiral position **216** to a straight position **222**, as shown in FIG. 2B. The actuating mechanism **218** can be a dial, an operator's hand, or any other suitable mechanism. By actuating the tubular structure **214** from a spiral position **216** to a straight position **222**, a rotational displacement is created. This rotational displacement allows for a lens to be rotated onto a patient's eye by transforming longitudinal displacement to rotational displacement.

Referring to FIG. 3, another embodiment of a pre-shaped spiral intraocular lens fixation device **300** is shown. Similar to the pre-shaped spiral intraocular lens fixation device **100** and **200**, the pre-shaped spiral intraocular lens fixation device **300** includes a hollow housing **302**, a handle **304**, a neck **306**, a vacuum chamber **308**, a head **312**, and a tubular structure **314**. The tubular structure can have a pre-shaped spiral position and a straight position. As shown in FIG. 3, positioned in conjunction with the tubular structure **314** is a suction cup **320**. The suction cup **320** is in communication with the vacuum chamber **308**, which receives a suction force from the vacuum source **310**. The vacuum source can be any pressurized source, such as a pump. The suction cup **320** can be made from a number of materials, such as medical grade plastic, for example. The suction cup **320** allows for an object, such as an intraocular lens, to be snared up from the eye of a patient, among other objects. Similar to the pre-shaped spiral intraocular lens fixation device **200**, actuating the tubular structure **300** allows for the pre-shaped spiral position to be changed to a straight position. By actuating the tubular structure **300**, the suction cup **320** can also be actuated from a pre-shaped spiral position to a straight position.

It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

I claim:

1. A pre-shaped spiral intraocular lens fixation device in combination with an intraocular lens, the combination comprising:

a hollow housing having an elongate neck and an elongate handle remote from the elongate neck, the hollow housing having a vacuum chamber;

a head disposed at an end of the neck distal from the handle;

a selectively operable vacuum source operatively attached to the housing and in communication with the vacuum chamber;

a tubular structure positioned within the hollow housing
and extending through the neck out through the head,
the tubular structure being in communication with the
vacuum chamber, the tubular structure having a spiral-
shaped position adjacent to the head, the tubular struc- 5
ture consisting of a nitinol material;
a suction cup positioned in conjunction with the spiral-
shaped region of the tubular structure;
an actuating mechanism in communication with the tubu-
lar structure, the actuating mechanism being selectively 10
movable;
wherein selective movement of the actuating mechanism
selectively moves the tubular structure between a spi-
ral-shaped position and a straight position; and
an intraocular lens; 15
wherein the handle is manipulated to control the elongate
neck, the head, the tubular structure, and the actuating
mechanism for positioning, dispensing and fixating the
intraocular lens.

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